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(71) Applicant

**Yoshida Kogyo K K**

**(Incorporated in Japan)**

**No 1 Kanda Izumi-cho, Chiyoda-ku, Tokyo, Japan**

(72) Inventors

**Tsutomu Hamatani**

**Yutaka Tominaga**

(74) Agent and/or Address for Service

**Marks & Clerk**

**57-60 Lincoln's Inn Fields, London, WC2A 3LS,  
United Kingdom**

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**E2S SBX SBB**

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(56) Documents cited

**GB 0935885 A**

(58) Field of search

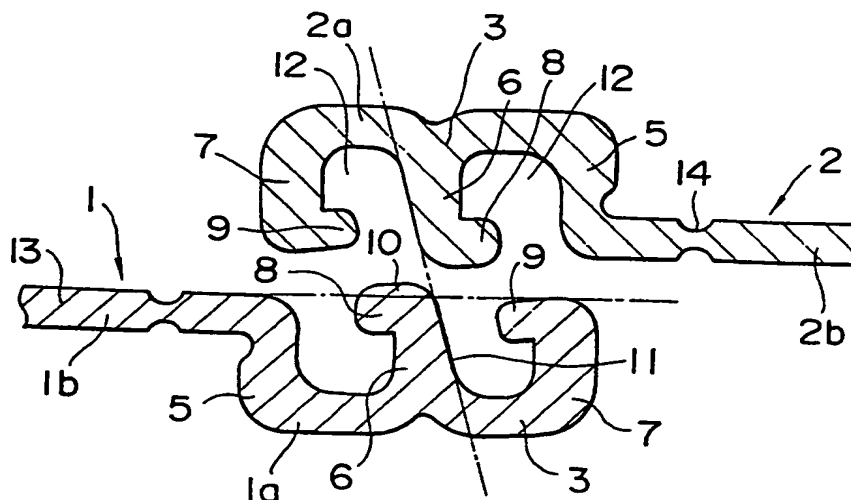
**UK CL (Edition K) E2S SBB SBX**

**INT CL<sup>5</sup> A44B**

(54) **Flexible closure device**

(57) A flexible closure device comprises a pair of fastener strips 1, 2 each including a web portion 1b, 2b and a marginal portion 1a, 2a. The marginal portion 1a, 2a includes a plurality of interlocking ribs 5, 6, 7 terminating in hooked coupling heads 8, 9 for coupling engagement with corresponding coupling heads 8, 9. The middle rib 6 has its hooked coupling heads 8 projecting beyond the rest of ribs 5, 7. One side surface 11, of the middle rib 6, devoid of the hooked coupling head 8, is inclined downwardly outwardly relative to the general plane of the middle rib 6.

**FIG. 1**



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FIG. 1

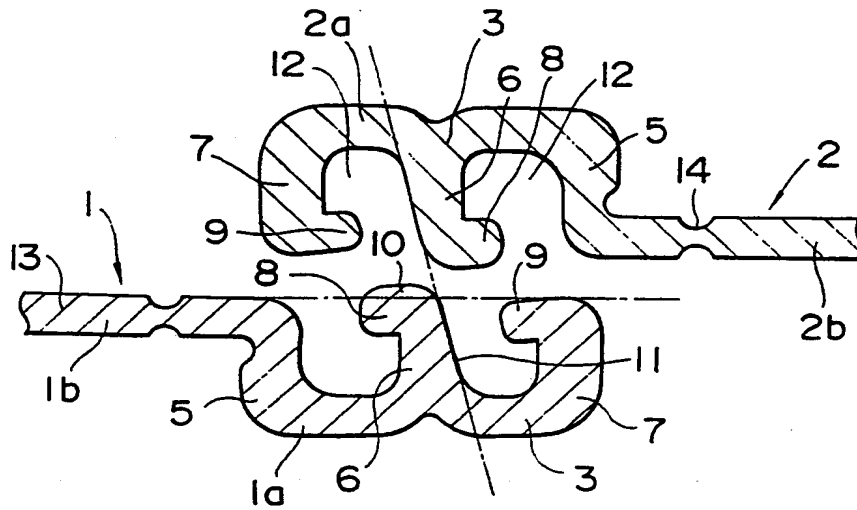


FIG. 2

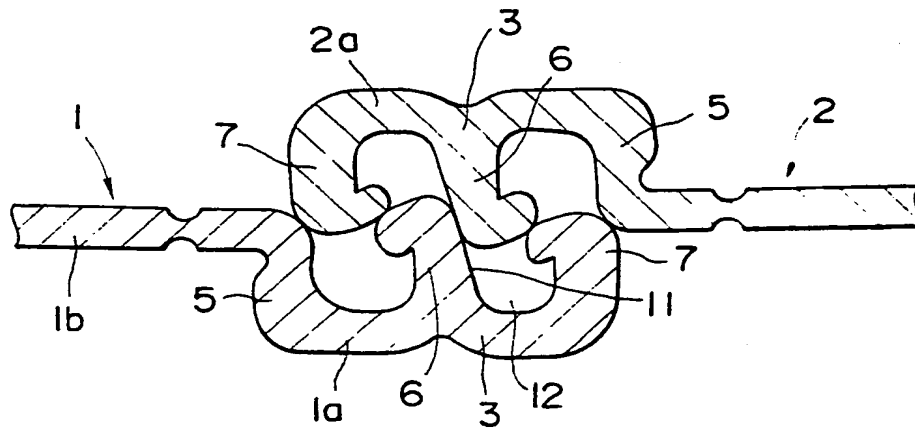


FIG. 3

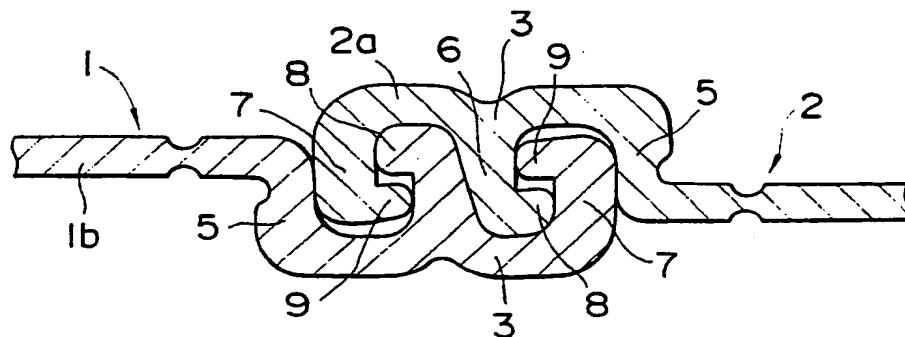


FIG. 4

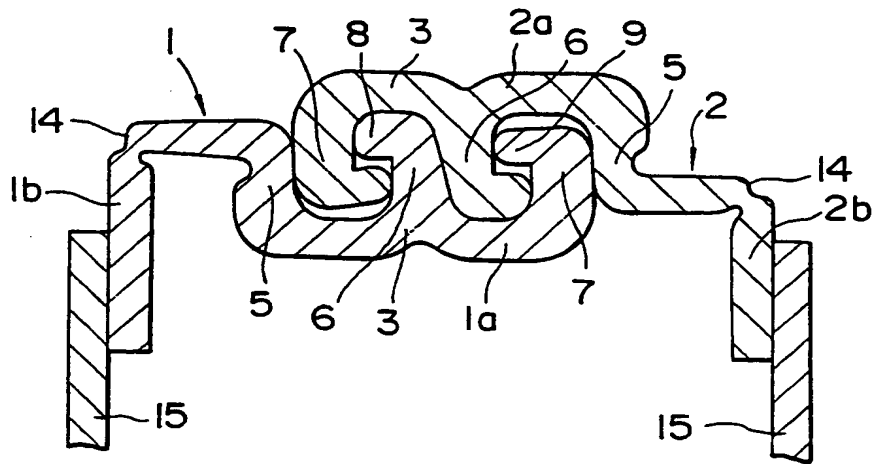
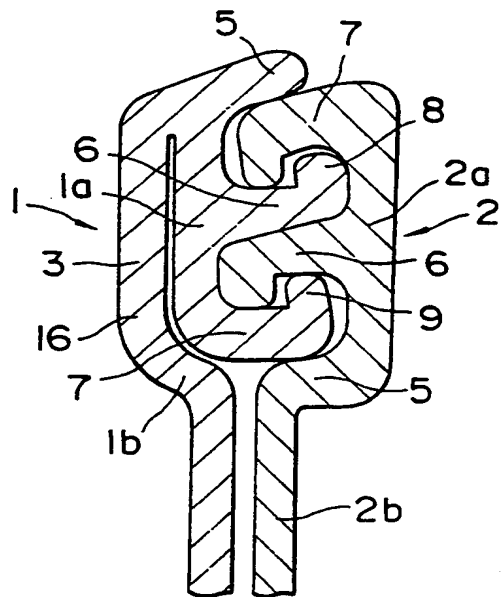


FIG. 5



## FLEXIBLE CLOSURE DEVICE

The present invention relates to a flexible continuous closure device of the type including a pair of elongated strips each strip having a plurality of continuous interlocking ribs along its one longitudinal marginal edge, the continuous interlocking ribs being releasably interlockable with the mating interlocking ribs of the coacting opposite fastener strip either by a slider mounted on the strip or merely by fingers.

A typical flexible closure device of the type described is disclosed in British Patent Application GB 2014232A. The disclosed closure device comprises a pair of elongated fastener strips each having a plurality of continuous interlocking ribs. Usually, these ribs are all of the same height. In addition, the ribs and the opposite side surfaces thereof stand substantially perpendicular to the general plane of the strip.

Although these closure devices are somewhat satisfactory in that they are simple in construction, easy to manipulate, and less expensive, they still suffer the following drawbacks. As all the ribs of the strip are of the same height, there is no reference point for aligning the elongated ribs of one strip with those of the opposite strip. This makes the alignment and hence the interlocking operation of the strips difficult and time-consuming.

Besides, the mating ribs of the coacting strips of the closure device are manufactured with less tolerance, so as to obtain increased watertightness and airtightness. This has made it extremely difficult for the ribs to wedge into

the inter-rib grooves of the coacting strip, thus rendering the opening and closing operations of the closure device sluggish.

With the foregoing difficulties in view, it is therefore an object of the present invention to provide a flexible closure device in which the mating ribs of the coacting strips are easily aligned with each other for interlocking; and, in which even if rendered high in airtightness and water tightness, the closure device enjoys light and smooth opening and closing operations for a prolonged period of time.

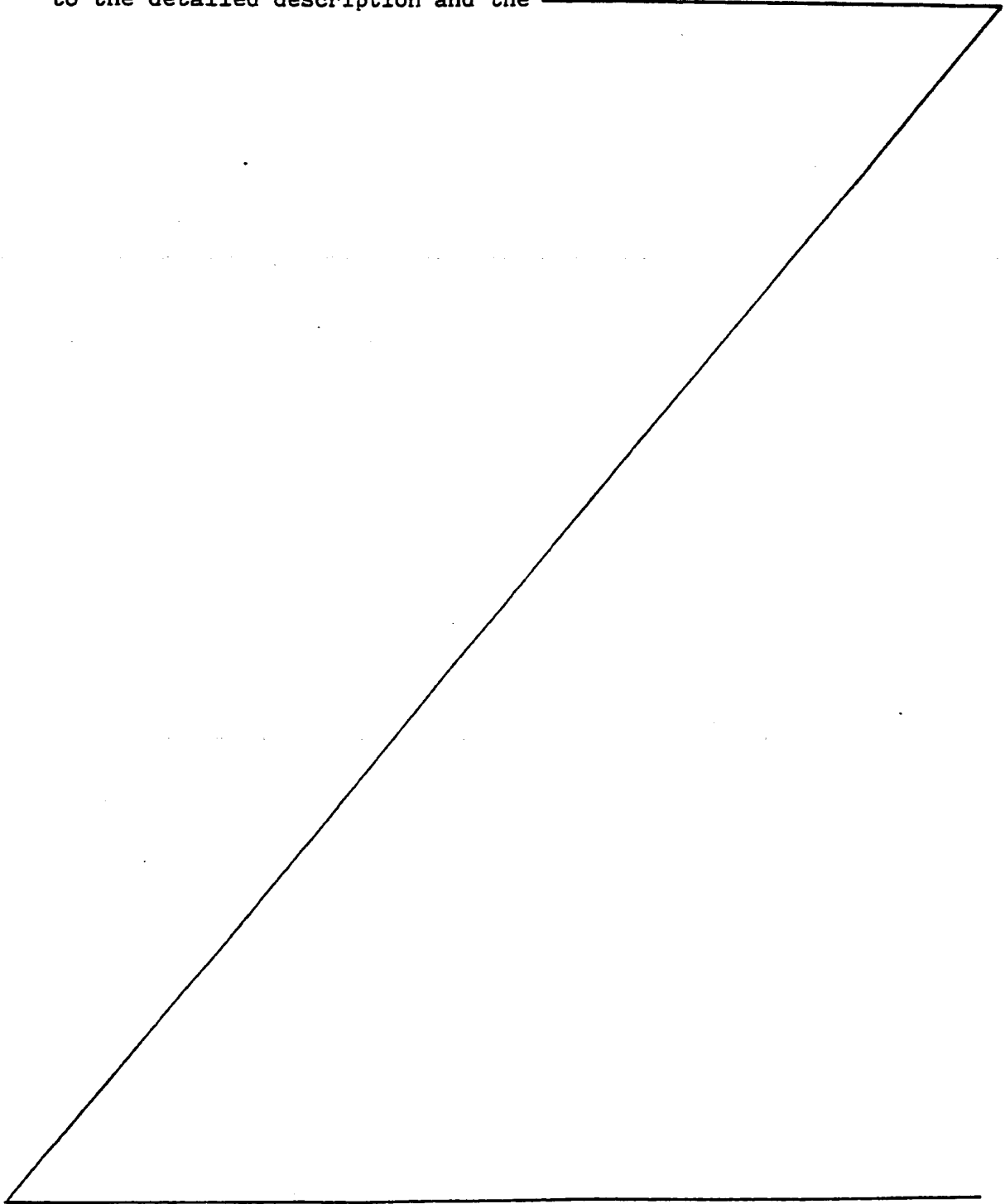
According to the present invention, there is provided a flexible closure device comprising

a pair of elongate fastener strips, each said fastener strip comprising:- a web portion, one longitudinal edge of said web portion being attachable to an article; and a marginal portion formed integrally with said web portion along another longitudinal edge of said web portion, the marginal portion comprising a base and a plurality of ribs, said ribs extending substantially perpendicular to said base and each of the ribs except for a rib proximal to the web portion terminating in a hooked coupling head for engaging with corresponding coupling heads of a co-acting opposite fastener strip;

the flexible closure device being characterised in that a middle rib of each said elongate fastener strip has a hooked coupling head which projects beyond the remaining ribs;

and in that one side surface of said middle rib of each said fastener strip is slightly inclined downwards and outwards relative to the general plan of the middle rib, said one side surface being devoid of a hooked coupling head.

Many other advantages and features of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the



accompanying sheets of drawings in which preferred structural embodiments incorporating the principles of the present invention are shown by way of illustrative example.

FIG. 1 is a cross-sectional view of a closure device according to the present invention, showing a pair of coacting fastener strips in uncoupled disposition.

FIG. 2 is a view similar to FIG. 1 but showing the fastener strips being on the verge of coming into coupling engagement with each other.

FIG. 3 is also a view similar to FIG. 1, but showing the fastener strips in coupled disposition.

FIG. 4 is a cross-sectional view of the closure device of FIG. 1 attached to opening edges of a pouch.

FIG. 5 is a cross-sectional view of a closure device according to another embodiment of the present invention.

FIGS. 1 through 3 inclusive shows a flexible closure device according to the present invention, and specifically a series of sequential steps of the coupling operation of the closure device. The closure device according to the present invention comprises a pair of elongated fastener strips 1, 2 made from a plastic such as polyvinyl chloride, polyethylene, polypropylene and the like. The fastener strips 1, 2, identical in cross-section, are interlockable with each other in airtight and watertight manner, as shown in FIG. 3.

Each of the fastener strips 1, 2 comprises a web portion 1b, 2b of which one longitudinal edge can be attached to an article such as clothings, baggages, pouches, etc. and a thicker

marginal portion 1a, 2a formed integrally along the other longitudinal edge of the web portion 1b, 2b. The marginal portion 1a, 2a includes a base 3 and a plurality of elongated interlocking ribs 5, 6, 7 extending substantially perpendicularly to the base 3 and running throughout the full length of the fastener strip 1, 2. The ribs, 5, 6, 7 are referred to as the first, the second and the third ribs 5, 6, 7, from a proximal end to a distal end of the marginal portion 1a, 2a. The second and third ribs 6, 7 each terminate in a hooked coupling head 8, 9, respectively, for firm coupling engagement with the corresponding hooked coupling heads 9, 8, respectively, of the coacting opposite fastener strip 2, as better shown in FIG. 3. The hooked coupling heads 8, 9 both face towards the web portion 1b, 2b.

It is to be noted that all the interlocking ribs 5, 7 are as high as one another except for the middle rib 6 which is a little higher than other ribs 5, 7, so that the middle interlocking rib 6 has its hooked coupling head 8 projecting beyond the level of the rest of ribs 5, 7 indicated by a phantom line in FIG. 1. This ensures that, when the first and second fastener strips 1, 2 are brought closer to each other for interlocking engagement, the hooked coupling heads 8, 8 of the two highest ribs 6, 6 of both strips 1, 2 first bump against each other, hence acting as efficient reference point for bringing the fastener strips 1, 2 ready for interlocking with each other at ease.

It is also to be noted that one side surface 11 of the middle rib 6, devoid of the hooked coupling head 8, is slightly



inclined downwardly and outwardly relative to the general plane of the middle rib 6, as also indicated by another phantom line in FIG. 1. This inclination of the surface 11 facilitates the middle rib 6 of the fastener strip 2 wedging into an elongated groove 12 partly defined by and between the adjacent ribs 6, 7, as better shown in FIG. 2.

Each of the fastener strips 1, 2 may have a slight recess or notch 14 formed in a suitable position in the web portion 1b, 2b and extending longitudinally of the respective fastener strip 1, 2 to thus accommodate easier flexing of the web portion 1b, 2b, as shown in FIG. 4. This facilitates attachment of the closure device to opening edges 15, 15 of opposed side pieces of a pouch, baggage or the like. Furthermore, the recess 14 helps to prevent such bending from having an influence on the interlocking operation of the coupling marginal portion 1a, 2a.

FIG. 5 shows another embodiment which is substantially identical with the preceding embodiment except that one fastener strip 1 is folded back with its web portion 1b laid flat on its marginal portion 1a, while the other fastener strip 2 is identical in construction with those in the preceding embodiment, so that the web portions 1b, 2b of the coacting fastener strips 1, 2, respectively, are disposed in opposed and parallel relation to each other. This arrangement makes the closure device suitable for attachment to a thin or flat pouch or the like article.

With the construction set forth above, the closure device according to the present invention enjoys the following advantages. The coacting fastener strips can be guided into a position ready for interlocking with each other at great ease.

Furthermore, even if the fastener strips are manufactured with little allowance for increased watertightness and airtightness, the closure device still enjoys light and smooth opening and closing operation for a prolonged period of time.

Obviously, various modifications and variations of the present invention are possible in the light of the above teaching. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described above.

CLAIMS:

1. A flexible closure device comprising a pair of elongate fastener strips, each said fastener strip comprising:- a web portion, one longitudinal edge of said web portion being attachable to an article; and a marginal portion formed integrally with said web portion along another longitudinal edge of said web portion, the marginal portion comprising a base and a plurality of ribs, said ribs extending substantially perpendicular to said base and each of the ribs except for a rib proximal to the web portion terminating in a hooked coupling head for engaging with corresponding coupling heads of a co-acting opposite fastener strip;

the flexible closure device being characterised in that a middle rib of each said elongate fastener strip has a hooked coupling head which projects beyond the remaining ribs;

and in that one side surface of said middle rib of each said fastener strip is slightly inclined downwards and outwards relative to the general plane of the middle rib, said one side surface being devoid of a hooked coupling head.

2. A flexible closure device according to claim 1 wherein each of said fastener strips has a recess formed in said web portion, said recess extending longitudinally of the respective fastener strip.

3. A flexible fastener strip according to claim 1 or 2 wherein one of said fastener strips is folded back with the web portion laid flat on the marginal portion, so that the web portions of the two coacting fastener strips are disposed in opposed and parallel relation to each other.

4. A flexible closure device comprising a pair of elongated fastener strips each including a web portion to have its one longitudinal edge attached to an article and a marginal portion formed integrally along the other longitudinal edge of the web portion, the marginal portion including a base and a plurality of interlocking ribs extending substantially perpendicularly to the base, all the ribs but a rib proximal to the web portion terminating in hooked coupling heads for coupling engagement with corresponding coupling heads of the coacting opposite fastener strip, characterised in that the middle rib has its hooked coupling head project slightly beyond the rest of ribs; and one side surface of the middle rib, devoid of the hooked coupling head is slightly inclined downwardly outwardly relative to the general plane of the middle rib.

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**Patents Act 1977**

**Examiner's report to the Comptroller under  
Section 17 (The Search Report)**

**Application number**

9124640.5

**Relevant Technical fields**

(i) UK Cl (Edition K ) E2S (SBB, SBX)

(ii) Int Cl (Edition 5 ) A44B

**Search Examiner**

P MCLAUGHLIN

**Databases (see over)**

(i) UK Patent Office

(ii)

**Date of Search**

16 JANUARY 1992

**Documents considered relevant following a search in respect of claims**

1-4

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 0935885 (FLEXIGRIP) see lines 87 to 89 on page 2	1-4

Category	Identity of document and relevant passages	Relevant to claim(s)

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